

WHAT IS CLAIMED IS:

1. A process for removing pollutants from an aqueous stream comprising contacting the aqueous stream with a shaped ion exchange composite at ion exchange conditions thereby removing at least some of the pollutants, the composite comprising a mixture of a microporous cation exchange composition and an anion exchange composition, where the cation exchange composition is selected from the group consisting of zirconium metallate, titanium metallate and mixtures thereof, the metallates respectively having an empirical formula on an anhydrous basis of:



or



where A is an exchangeable cation selected from the group consisting of potassium ion, sodium ion, calcium ion, magnesium ion and mixtures thereof, M is at least one framework metal selected from the group consisting of hafnium (4+), tin (4+), niobium (5+), titanium (4+), cerium (4+), germanium (4+), praseodymium (4+), and terbium (4+), except that M is not titanium in formula (II), "p" has a value from about 1 to about 20, "x" has a value from zero to less than 1, "n" has a value from 0 to about 12, "y" has a value from 0 to about 12, "m" has a value from about 3 to about 36 and $1 \leq n + y \leq 12$, and the anion exchange composition is selected from the group consisting of hydrous zirconium oxide, zirconia, alumina, titania, hydrous titanium oxide, layered double hydroxides, single phase metal oxide solid solutions, magnesium hydroxide, calcium hydroxide, silica, amorphous mixed metal oxides, basic clays and mixtures thereof.

2. The process of claim 1 where the pollutant is ammonium ion.
3. The process of claim 1 where the pollutant is phosphate ion.
4. The process of claim 1 where the ion exchange composite is in a shape selected from extrudates, pills, pellets, spheres and irregularly shaped particles.

5. The process of claim 1 where the composite is further characterized in that it contains a binder selected from the group consisting of hydrous zirconium oxide, zirconia, zirconium phosphate, alumina, aluminum phosphate, titania, titanium phosphate, hydrous titanium oxide, layered double hydroxides, magnesium hydroxide, calcium hydroxide, silica, basic clays and mixtures thereof.
6. The process of claim 1 where M is tin (4+).
7. The process of claim 1 where M is titanium (4+).
8. The process of claim 1 where M is niobium (5+).
9. The process of claim 1 where $n = 0$.
10. The process of claim 1 further characterized in that the A cation is exchanged for a different secondary cation, A', selected from the group consisting of alkali metals, alkaline earth metal, hydronium ions and mixtures thereof.
11. The process of claim 11 where A' is a mixtures of sodium and calcium ions.
12. The process of claim 11 where A' is a mixture of sodium, calcium and hydronium ions.
13. The process of claim 1 where the cation exchange composition has the structure of UZSi-9, UZSi-11 or UZSi-1.